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Abstract

COMPLEX EXPLOITATION OF URANIUM IN A DEPOSIT INCLUDING THE LOW-GRADE ORES

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To solve the problem of exploitation of uranium of a given deposit, the detailed investigation was required to study the economically feasible extraction of metal from the low grade ores.

In the exploitation of uranium deposits, high grade ores are processed by the "agitation" in hydrometallurgical plants. Low grade ores, unavoidably accompanying the high grade ones, are partly left in situ and partly stocked on the surface. Due to the low concentration of uranium, these low grade ores - waste - have not been treated for the extraction of uranium up to the present time.

The intention of our studies has been to determine higher economy of the process of uranium extraction from the low grade uranium ores. The crushed low grade ores were treated by circulation of the corresponding solutions, to prevent large scale investment costs, as well as the costs necessary for more classical ore processing in the plants.

The results of the laboratory scale investigations have been demonstrated, as well as the large scale field investigations.

Four different ore samples have been selected in the laboratory studies. The results of these investigations and the factors which could have influence on the uranium leaching by this process have been discussed. The results of these studies have demonstrated lower or even the same uranium leaching comparing with the process of "agitation".

Large-scale investigations have been carried out in the mine. Special attention has been paid to the extraction of uranium at the lowest possible costs. The tests have been carried out in the pit - in situ and outside during the leaching process - "in heap", with larger quantities of ores. These experiments have confirmed the laboratory results and pointed out the feasibility of the application of leaching in situ and "in heap".

The results of described investigations point out the possibility of the extraction of uranium from the low grade ores at acceptable costs.